THE NEED FOR THE UNITED STATES ARMY TO POSSESS A LANDING CRAFT WITH MANEUVER CAPABILITIES

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

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Fort Leavenworth, Kansas
2015

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
12-06-2015	Master's Thesis	AUG 2014 – JUN 2015

4. TITLE AND SUBTITLE

The Need For The United States Army To Possess A Landing Craft With Maneuver Capabilities

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Philip Raumberger, Major

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Landing Craft Mechanized (LCM) was used in Army and Joint combat, stability, and support to civil authority operations for over 50 years. The LCM is the Army's smallest, most practical capability to conduct operational maneuver within the littorals to achieve tactical success, move operationally ready forces by water to austere access points, and rapidly enable sustainment operations via inland waterways. The LCM has exceeded its operational lifecycle and does not meet the Joint Task Force Commanders' required capabilities for waterborne operations. Those requirements include: to carry an M1A2 tank, to maneuver "combat ready" Stryker vehicles, and to rapidly maneuver and deploy combat forces. The Army concept framework together with the Army Transportation Corps' Capability Based Assessment (CBA) of Army watercraft and historical landing craft uses provides a case study into the landing craft capability gap. The Army must decide whether to retain, divest, or pursue a new material landing craft solution that meets the needs of the Joint Task Force Commander.

15. SUBJECT TERMS
Army Landing Craft, Maneuver Support Vessel, MSV(L), LCM-8, Army Waterborne Maneuver, Army Watercraft LOTS, JLOTS, Logistics over the Shore

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	70	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE NEED FOR THE UNITED STATES ARMY TO POSSESS A LANDING CRAFT WITH MANEUVER CAPABILITIES, by MAJ Philip S. Raumberger, 70 pages

The Landing Craft Mechanized (LCM) was used in Army and Joint combat, stability, and support to civil authority operations for over 50 years. The LCM is the Army's smallest, most practical capability to conduct operational maneuver within the littorals to achieve tactical success, move operationally ready forces by water to austere access points, and rapidly enable sustainment operations via inland waterways. The LCM has exceeded its operational lifecycle and does not meet the Joint Task Force Commanders' required capabilities for waterborne operations. Those requirements include: to carry an M1A2 tank, to maneuver "combat ready" Stryker vehicles, and to rapidly maneuver and deploy combat forces. The Army concept framework together with the Army Transportation Corps' Capability Based Assessment (CBA) of Army watercraft and historical landing craft uses provides a case study into the landing craft capability gap. The Army must decide whether to retain, divest, or pursue a new material landing craft solution that meets the needs of the Joint Task Force Commander.

ACKNOWLEDGMENTS

I am greatly indebted to my Thesis Committee, chaired by Mr Michael E.Weaver, my two readers, Dr Kenneth E. Long, and Mr Gerald J. Leonard whose constant and constructive guidance made it possible for me to succeed in this endeavor.

I am also grateful to the Directorate of Graduate Degree Programs headed by Dr Baumann, and his excellent team, Dr Hernandez and Ms Krueger for their consistent professional guidance throughout the year.

I also wish to express my gratitude to the Team 13 Leader, Mr Lloyd Sherfey and Staff Group Advisor (13A), Mr George Hodge,and faculty instructors, Dr James Willbanks, and Mr Kevin Gentzler for their effective tutoring and constant mentoring. I enjoyed the unique academic culture of sharing professional experiences with all staff group members in 13A and the professionalism and teamwork each contributed to the group.

Special thanks goes to my wife, Maureen Casey, for her dedication, encouragement, and support throughout the academic school year; I love you.

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ACRONYMS

A2AD	Anti-Access Area Denial
ABCT	Armor Brigade Combat Team
ACC	Army Capstone Concept
AOC	Army Operating Concept
APOD	Airport Of Debarkation
ARCIC	Army Capability Integration Center
AWMP	The Army Watercraft Master Plan
CAF	Commander Amphibious Forces
CATF	Commander Amphibious Task Force
CBA	Capabilities Based Assessment
CBRN	Chemical, Biological, Radiological, and Nuclear
CLF	Commander Landing Force
DOTMLPF-P	Doctrine, Organization, Training, Material, Leadership and Education, Personnel, Facilities and Policy
FAA	Functional Area Analysis
FNA	Functional Needs Analysis
FSA	Functional Solution Analysis
HADR	Humanitarian Assistance, Disaster Relief
HTAR	How The Army Runs
IBCT	Infantry Brigade Combat Team
JCIDS	Joint Capabilities Integration and Development System
JFMCC	Joint Force Maritime Component Commander
JOA	Joint Operations Area

JROC	Joint Requirements Oversight Council
JTFC	Joint Task Force Commander
LCAC	Landing Craft Air Cushion
LCM-8	Landing Craft Mechanized-8
LCU	Landing Craft Utility
LOC	Lines of Communication
LOTS	Logistics Over The Shore
LSV	Logistics Support Vessel
MSV(L)	Maneuver Support Vessel Light
RFI	Request for Information
SBCT	Stryker Brigade Combat Team
SPOD	Sea Ports Of Debarkation
ULO	Unified Land Operations
WFP	World Food Program

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CHAPTER 1

INTRODUCTION

There is an Army watercraft capability gap that limits the Joint task force commander's (JTFC) ability to conduct operational maneuver within the littorals to achieve tactical success, move operationally ready forces by water to austere access points, and rapidly support sustainment requirements via inland waterways.[1] The littorals include those land areas (and their adjacent sea and associated air space) that are predominantly susceptible to engagement and influence from the sea.[2] Exacerbating the capability gap is the aging Army watercraft fleet, most notably the Landing Craft Mechanized 8 (LCM-8). The LCM-8 is one of the Army's most practical material solutions for moving within the littorals and inland waterways, but it is at the end of its operational lifecycle and has significant limitations to its carrying capacity, speed, and capabilities to meet the combatant commander's intent for waterborne maneuver.

The Army must decide whether to retain, divest, or pursue a new material solution to replace the capabilities provided by the LCM-8. This dilemma provides a case study into a known capability gap with uncertain consequences. This research project will investigate the breadth and depth of the Army landing craft capability gap and determine if solutions exist to fill that gap and how well those solutions meet the JTFC requirements for waterborne operations within the full range of military operations.

Historical Uses of Army Landing Craft

The Army has utilized watercraft to move personnel and sustainment material in hundreds of operations over the last century. The Army conducted some of the largest

amphibious operations in our military's history. In World War II, the Army conducted 58 amphibious landing operations including Normandy, Sicily, North Africa, and Iwo Jima.[3] During the Korean War, the Army's 7th Division landed at Inchon on 18 September 1950 as part of Operation Chromite. In all, 40,000 Soldiers and Marines made amphibious landings at Inchon, predominantly in Army landing craft.[4]

The Army also relied heavily on its watercraft during the Vietnam War, specifically in the Mekong Delta from 1967-1969. The 2nd Brigade, 9th Division conducted extensive riverine operations to virtually eliminate North Vietnamese and Viet Cong influence in the Dong Tam area. The riverine Joint force consisted of a reinforced Army brigade with US Navy and South Vietnamese personnel and equipment. In addition to armored assault craft, patrol boats, and floating barracks, the river assault squadrons in the 2nd Brigade contained as many as 70 LCM-6 and LCM-8 designed to serve as command and communications boats, troop carriers, monitors, refuelers, and mortar platforms.[5] The capabilities of the Joint force were used to the fullest by combining tactical movement and maneuver of assault and fire support units by land, air and water. The 5,000 man force could travel up to 200 kilometers in a 24-hour period and then launch an attack within 30 minutes after anchoring in previously inaccessible or remote territory.[6]

In May 1989, during Operation Nimrod Dancer in Panama, in preparation for Operation Just Cause, two battalions from the 9th Infantry Regiment used landing craft from the 1097th Medium Boat Company to shuttle personnel and equipment from Howard Air Base on the Pacific coast through the canal to Fort Sherman on the Atlantic side. On 20 December, 1989, C Company, 3-504th Infantry used two LCM-8 to

maneuver into position for a raid on the Chagres River, part of a two pronged attack on the Renacer Prison to free Americans and Panamanian political prisoners being held there. Another LCM-8 delivered special operations forces into the busy city of Colon. The following day, four LCM-8 began shuttling refugees from the Atlantic side of Panama to Fort Clayton on the Pacific side and shuttle prisoners to the Goulic Detention Facility. LCM-8 were used in Panama to bypass unreliable road networks. Additionally, the watercraft provided a critical method of tactical movement without using already overtaxed helicopter assets. These uses of the LCM-8 demonstrate the ability of Army landing craft to enhance maneuver and increase the options available to the JTFC.[7]

Within the last 25 years, the LCM-8 and other landing craft have been used numerous times for Humanitarian Assistance and Disaster Relief (HADR) operations. After Hurricane Hugo decimated parts of the Carolina coast in 1989, the 6th Transportation Battalion from Fort Eustis deployed four landing craft and crews to the Charleston, South Carolina area to ferry people and equipment between the mainland and coastal islands after the bridges were destroyed.[8] The World Food Program (WFP) and other humanitarian aid providers perfected the use of military landing craft after the 2004 Indian Ocean tsunami and the 2009 Myanmar cyclone.[9] The landing craft enabled the relief effort to bypass partially destroyed and congested harbors to deliver aid directly to some of the most isolated locations. The WFP used landing craft, including the LCM-8, to deliver relief supplies to Haiti in January 2010 following a massive earthquake and tsunami. Transportation units from Fort Eustis contributed landing craft and crews to the Haiti aid effort.[10]

A good example of the risk associated with an amphibious capability gap is identified when examining the British assault on the Falkland Islands in 1982's Operation Corporate. The British nearly lost Operation Corporate due to a lack of amphibious capabilities and adequate forces trained in expeditionary and amphibious operations. The Argentineans used minimal anti-access area denial (A2AD) enablers to oppose the British amphibious landings, yet the British struggled significantly due to their unpreparedness for the attack. The British successes and failures in the Falkland Islands is a case study by itself, but the overarching affects that capability gaps pose on a military's readiness is a factor that must be emphasized. The United States finds itself on the verge of a similar scenario as it shifts its focus to the western Pacific and loses the aging capabilities of the LCM-8. There are notable dissimilarities in each nation's respective circumstances; however, there are more than enough striking similarities that they are due investigation.[11]

Landing Craft Requirements Grounded in Doctrine

Current Army and Joint doctrine indicates a growing need for an amphibious vessel that can enhance both movement and maneuver within the waterborne corridor. The waterborne corridor is a non-doctrinal term for any single or combination of water Lines of Communication (LOCs) ranging from open ocean to rivers and canals. A LOC is any route that connects an operating military unit with its supply base. Like ground and air LOCs, waterborne corridors represent a domain that can be exploited with the right capability. TP 525-3-0, *The U.S. Army Capstone Concept* (ACC) published in 2012 suggests that adversaries will employ A2AD strategies, innovative tactics, and advanced technologies to oppose US security interests. The ACC also emphasizes a need for the

US military to realign focus on the Asia-Pacific. “The greatest potential threats to [US National Security] interests lie in Asia. The Army must realign its focus and adjust priorities as the focus shifts. Some adversaries are investing in A2AD capabilities to counter the US ability to project military force into an operational area with sufficient freedom of action to accomplish assigned missions.”[12]

As the JTFC’s primary ground combat force, the ACC directs that the Army projects forces worldwide into any operational setting and conducts operations immediately upon arrival. Expeditionary operations require the ability to deploy quickly to austere areas and shape conditions to seize and maintain the initiative. The Army will leverage the breadth and depth of its means to meet JTFC mission requirements rapidly with scalable and tailored expeditionary force packages that complement other service capabilities. These capabilities are resident in readily available and trained regionally and globally aligned Army forces. Reducing reliance on intermediate staging bases, ports, and airfields will better enable an expeditionary Army to respond rapidly and attack simultaneously throughout the depth and breadth of a Joint Operations Area (JOA) while diminishing enemy A2AD capabilities.[13]

TP 525-3-1, *The U.S. Army Operating Concept* (AOC) from 2014 states, “Joint combined arms operations allow JTFCs to operate consistent with the tenet of *initiative*, dictating the terms of operations and rendering the enemy incapable of responding. Future forces operating as part of Joint teams will conduct expeditionary maneuver through rapid deployment and transition to operations.” The AOC further requires that “future forces conduct operations consistent with the tenet of *adaptability*, anticipating dangers and opportunities and adjusting operations to seize, retain, and exploit the

initiative."[14] The future force must be equipped to exercise multiple options across multiple domains. Seventy-five percent of the human population lives within 100 miles from the coast, and a majority of the planet's urban areas are built along the coast or inland waterways.[15] The Army must have a capability to operate and maneuver within the waterborne corridor.

The Army Landing Craft Fleet

The Army Watercraft Fleet is configured and positioned to increase access to areas of operations by supporting fixed port operations, amphibious shore landing, and operational maneuver and sustainment throughout intra-coastal zones and inland waterways. Army watercraft are employed to maneuver combat forces to the place and time they are needed, to manage and clear Sea Ports of Debarkation (SPOD), enhance the throughput of an already saturated SPOD through alternative avenues, and to support distribution via intra-theater LOCs. These waterborne operations are conducted forward of the strategic seaport and are entirely tactical in nature.[16] Watercraft provide operational agility to the JTFC by extending operational reach and bypassing A2AD capabilities enhanced by naturally restricted terrain such as inland waterways, chokepoints, and coastal regions.

The Army has limited options to move men and material within the waterborne corridor. Lighters are used to transport equipment, cargo, and personnel between ships, from ship to shore, or for intra-theater transport. Lighters are further classified into conventional displacement (landing craft) or modular causeway system (causeway ferry). The three landing craft in the Army's watercraft fleet are described below:

Logistics Support Vessel

The LSV is a worldwide deployable vessel that provides transport of combat vehicles and sustainment cargo in the theater zone. It provides intra-theater line haul of large quantities of cargo and equipment. Tactical resupply missions can be performed to remote underdeveloped coastlines and inland waterways.[17] The LSV is the largest landing craft in the fleet, capable of carrying the equivalent of 24 M1A2 tanks. (see figure 1)

Characteristics/capabilities
Class: A2
Length overall: LSV 1 through 6 - 272.75 feet (83.1m);
LSV 7 and 8 – 314 feet (95.7m)
Beam: 60 feet (18.3m)
Displacement (loaded): LSV 1 through 6 - 4,199 long tons;
LSV 7 & 8 – 5,905 long tons
Deck area: 10,500 sq. ft. (up to 24 M1 main battle tanks or 24 [48 double stacked] 20-foot ISO containers) (975.5 sq meters)
Payload: 2,000 short tons (equivalent payload capacity of 40 C-17s) (1814.4 metric tonnes)
Range: LSV 1 through 6 - Light: 8,200 NM at 11.5 knots, Loaded: 6,500 NM at 11 knots;
LSV 7 & 8 – Loaded: 5500 nm at 12 knots
Draft: Light: 6 feet (1.8m)
Loaded: LSV 1 through 6 - 12 feet (3.7m); LSV 7 & 8 – 13 feet
Crew size: 31 (8 warrant officers and 23 enlisted for 24-hour operation)
On-hand: 8

Figure 1. Logistics Support Vessel Characteristics

Source: Headquarters, Department of the Army, ATTP 4-15, *Army Water Transport*

Operations (Washington, DC: Government Printing Office, 2011), 2-9.

Landing Craft Utility 2000

The LCU-2000 provides transport of combat vehicles and sustainment cargo. It provides intra-theater movement of cargo and equipment. Tactical resupply missions can be performed to remote, underdeveloped coastlines and inland waterways.[18] The LCU-2000 can carry the equivalent of 5 M1A2 tanks. (see figure 2)

Characteristics/capabilities
Class: A1
Length overall: 174 feet (53m)
Beam: 42 feet (12.8m)
Displacement (weight): 575 long tons (light); 1,087 long tons (loaded)
Deck area: 2,500 sq. ft. (5 M1 main battle tanks or 15 [30 double stacked] 20-foot ISO containers) (232.3 sq meters)
Payload: 350 tons (equivalent payload capacity of 7 C-17 loads) (317.5 metric tonnes)
Range: Light: 4,500 NM at 12 knots
Loaded: 4,500 NM at 10 knots
Draft: Light: 8 feet (2.4m)
Loaded: 9 feet (2.7m)
Crew size: 13 (2 warrant officers and 11 enlisted for 24-hour operation)
On-hand: 34

Figure 2. Landing Craft Utility Characteristics

Source: Headquarters, Department of the Army, ATTP 4-15, *Army Water Transport*

Operations (Washington, DC: Government Printing Office, 2011), 2-11.

Landing Craft Mechanized 8

The LCM-8 transports cargo, troops, and vehicles from ship to shore or in retrograde movements. It is also utilized in lighterage operations and utility work in harbors. It is designed for use in rough or exposed waters and is capable of operating through breakers and grounding on a beach. The smallest of the landing craft, its size facilitates its use in confined areas.[19] (see figure 3)

Characteristics/capabilities
Class: B
Length overall: 74 feet (22.5m)
Beam: 21 feet (6.4m)
Displacement (weight): 58 long tons (light); 111 long tons (loaded)
Deck area: 620 sq. ft. (two 20-foot ISO containers or 200 combat-equipped soldiers) (57.6 sq meters)
Payload: 53 tons (equivalent payload capacity of one C-17 load) (48 metric tonnes)
Range: Light: 332 NM at 11 knots
Loaded: 271 NM at 9 knots
Draft: Light: 3.5 feet (1m)
Loaded: 5 feet (1.5m)
Crew size: 6 enlisted (3 per shift for 24-hour operation)
On-hand: 42

Figure 3. Landing Craft Mechanized Characteristics

Source: Headquarters, Department of the Army, ATTP 4-15, *Army Water Transport*

Operations (Washington, DC: Government Printing Office, 2011), 2-12.

Smaller vessels, such as the LCM-8, are uniquely designed to provide a range of capabilities that include movement of critical cargo and other movements in constricted areas of the littorals and inland waterways. These vessels were designed to support maneuver and sustainment by providing access to inland forces and facilities that cannot be accessed by land-based LOCs because of terrain or operational considerations. This gives the JTFC the ability to support small units and distributed forces with a platform capable of moving well into remote areas of the battlefield and with a larger capacity than tactical wheeled vehicles.[20]

The LCM-8 is rapidly approaching the end of its useful life. Although the Army has no other vessel with the capability provided by the LCM-8 (a small, maneuverable craft capable of inland waterway operations) the platform itself is in need of replacement. The cost to maintain these vessels exceeds the cost to replace them. Annual maintenance costs were approaching $600K per vessel in 2008 and the cost to modernize and extend the life of each craft is approximately $800K. As an interim measure, the Army has begun divesting down to the minimum wartime essential number of craft to save on maintenance, storage, and preservation costs. At the same time, the Army is dedicating resources toward researching, testing, developing, and evaluating the capabilities and requirements the Army needs for its replacement.[21]

In addition to the increasing maintenance costs, there are several disadvantages of the LCM-8 that should be considered when designing a replacement vessel. The LCM-8 was designed to enable maneuver of combat equipment like the M60 tank, but now lacks the carrying capacity for today's technology. The 73 short ton M1A2 tank exceeds the 53

short ton max payload capability of the LCM-8. A maneuver enhancing vessel must be capable of moving all types of ground maneuver forces and equipment in the Army inventory. Additionally, the lack of a stern ramp on the LCM-8 requires vehicles to back onto the vessel which increases the time necessary to load vehicles aboard the LCM-8. A vessel with both bow and stern ramps allows vehicles to drive through the vessel from stern to bow, decreasing loading time that is critical when making multiple lifts with the same vessel. Finally, at 9 knots and 5 feet of draft while laden, the replacement to the LCM-8 should have better speed and a shallower draft.[22] (See figure 4) Subject matter experts in CASCOM coined the term Maneuver Support Vessel Light (MSV(L)) as a concept boat "with increased capabilities that would replace the current LCM-8, a 40-year old Vietnam era boat."[23] This research will continue to utilize the acronym MSV(L) when describing a replacement vessel for the LCM-8.

Figure 4. LCM-8 Laden with Cargo in Support of Hurricane Katrina Disaster Relief

Source: Brian Seymour, "United States Navy, Gulf of Mexico," 31 August 2005,

accessed 15 May 2015, http://sv.wikipedia.org/wiki/LCM-8.

This research is not limited to amphibious operations, "a military operation launched from the sea by an amphibious force to conduct landing force operations within the littorals," as defined in JP 3-02, *Amphibious Operations.* This research is focused on examining the capabilities necessary for the Army to enhance movement and maneuver within the waterborne corridor along all water LOCs, including all possibilities of ship to shore and shore to shore movements and maneuvers.

This research will not examine changes to the Army's core competencies to include mission command over amphibious operations. The US Navy and Marines maintain command and control of amphibious forces operations using the structures outlined in JP 3-02.[24] Joint operations including amphibious operations will likely include a functional component commander, Commander Amphibious Forces (CAF), with subordinate Commander Amphibious Task Force (CATF) and Commander Landing Force (CLF). Subordinate commanders that may be designated as the CAF include the Joint Force Maritime Component Commander (JFMCC) or the commander of a naval task force or group under the JFMCC. The CATF is the Navy officer designated in the initiating directive as the commander of the ATF. CLF is the officer designated in the initiating directive as the commander of the landing force for an amphibious operation. The role of the Army in an amphibious operation may be as the overall JTF commander, or the landing force may be composed partially or entirely of Army forces.[25]

Army landing craft have been used extensively within the full range of military operations, during both wartime and peace. The capabilities that the LCM-8 brings to the JTFC to enhance maneuver as well as enable sustainment proved invaluable during

conflicts in WWII, Korea, and Vietnam as well as during humanitarian assistance operations around the world. Current Army doctrine clearly indicates that the Army will realign focus to the Asia-Pacific region and that our future force must have the adaptability to quickly deploy to austere areas and shape conditions to seize and maintain the initiative. The Army is required in ADP 3-0 to conduct decisive action and combined arms maneuver in support of unified action. The ability to move and maneuver within the waterborne corridor is a necessary capability to enable freedom of action to accomplish assigned missions.

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[1] Chief of Transportation, U.S. Army Transportation Corps, *Army Watercraft Master Plan, Fleet Strategy April 2008* (Fort Eustis, VA: Government Printing Office, 2008), D-2.

[2] Chairman, Joint Chiefs of Staff, *Joint Concept for Entry Operations* (Washington, DC: Government Printing Office, 2014), xi.

[3] Douglas A. Goepfert, "The Army in Amphibious Warfare: A Contemporary Appraisal" (Masters thesis, US Army Command and General Staff College, 1987), 1.

[4] Donald W. Boose Jr., *Over the Beach, US Army Amphibious Operations in the Korean War* (Ft. Leavenworth, KS: Combat Studies Institute Press, 2008), 182.

[5] William B. Fulton, *Vietnam Studies, Riverine Operations 1966-1969* (Washington, DC: Government Printing Office, 1973), 31.

[6] Ibid., 185.

[7] R. Cody Phillips, *Operation Just Cause, The Incursion into Panama* (Washington, DC: Government Printing Office, 1990), 28.

[8] Daily Press, "More Soldiers Sent To Aid Charleston," 7 October 1989, accessed 25 September 2014, http://articles.dailypress.com/1989-107/news/8910070078_1_ sullivans-island-soldiers-ferry.

[9] James Kilner, "Landing Craft Bring Food to Haiti's Hungry," Thomas Reuters Foundation, 29 January 2010, accessed 25 September 2014, http://www.trust.org/item/ 20100129152200-1k60z/?source=search.

[10] Mike Holtzclaw, "Soldiers From Fort Eustis Heading to Haiti," *Daily Press*, 20 January 2010, accessed 25 September 2014, http://articles.dailypress.com/2010-01-20/news/dp-now-eustis-haiti.j20_1_soldiers-from-fort-eustis-10th-transportation-battalion-haiti.

[11] Benjamin W. Grant, "The Need for the United States of America's Amphibious Capability in an Era of Maritime Focus" (Masters thesis, US Army Command and General Staff College, 2013), 3.

[12] Headquarters, Department of the Army, TRADOC PAM 525-3-0, *The U.S. Army Capstone Concept* (Washington, DC: Government Printing Office, 2012), 7.

[13] Ibid., 12.

[14] Headquarters, Department of the Army, TRADOC PAM 525-3-1, *The U.S. Army Operating Concept, Win in a Complex World 2020-2040* (Washington DC: Government Printing Office, 2014), iii.

[15] Scott Bowden, *Forward Presence, Power Projection, and the Navy's Littoral Strategy* (Arlington, VA: IRIS Corporation, 1997), 47.

[16] Chief of Transportation, B-1.

[17] Headquarters, Department of the Army, Army Tactics, Techiques, and Procedures (ATTP) 4-15, *Army Water Transport Operations* (Washington, DC: Government Printing Office, 2011), 2-9.

[18] Ibid., 2-11.

[19] Ibid., 2-12.

[20] Chief of Transportation, B-5.

[21] Ibid., 2-6.

[22] Ibid., A-10.

[23] U.S. Army Contracting Command, "Request for Information (RFI) for Maneuver Support Vessel (Light) (MSV(L)) as a Replacement for the Landing Craft Mechanized (LCM-8) with Addendum 1 and 2" (Report, Army Contracting Command-Warren, Warren, MI, 15 April 2014).

[24] Chairman, Joint Chiefs of Staff, Joint Publication (JP) 3-02, *Amphibious Operations* (Washington, DC: Government Printing Office, 2014), xii.

[25] Ibid., II-7.

CHAPTER 2

LITERATURE REVIEW

The Army landing craft was used extensively in direct action, stability operations, and support to civil authority operations over the last century; future Army and Joint operations will necessitate a landing craft capability to extend operational reach and enable decisive action across all domains. The Landing Craft Mechanized (LCM-8) is the Army's smallest, most practical capability to conduct operational maneuver within the littorals to achieve tactical success, move operationally ready forces by water to austere access points, and rapidly enable sustainment requirements via inland waterways.[1] The LCM-8 is at the end of its operational lifecycle and has significant limitations to its carrying capacity, speed, and capabilities to meet the combatant commander's intent for operational waterborne maneuver. The capability that the LCM-8 brings to the JTFC to enhance maneuver as well as enable sustainment was proven invaluable, but no longer meets the requirements.

Current Army and Joint doctrine indicates a growing importance for a full spectrum of watercraft capability enablers at the tactical and operational level. This chapter will illustrate the resounding theme within the Army Concept Framework for an adaptable, expeditionary force capable of supporting the JTFC in any operating environment with scalable and tailored force packages. Detailed assessments of Army watercraft capabilities and platforms reveal that Army watercraft provides extensive options to the JTFC to expand his movement and maneuver options within the land and water domains. Insight into the watercraft fleet also shows that the LCM-8 lacks or underperforms in several parameters, and the landing craft has exceeded its service life.[2]

Investigation into military history since the Vietnam War indicates that Army landing craft were used very successfully as both logistical movement and operational maneuver platforms during direct action, contingency, and stability operations both within the United States and abroad.

The U.S. Army Capstone Concept

TRADOC Pam 525-3-0, *The U.S. Army Capstone Concept* (ACC) emphasizes the importance of maintaining a trained and ready force with improved expeditionary capabilities. The Army projects forces worldwide into any operational setting and conducts operations immediately upon arrival. Expeditionary operations require the ability to deploy quickly to austere areas and shape conditions to seize and maintain the initiative. The Army will leverage the breadth and depth of its means to meet JTFC mission requirements rapidly with scalable and tailored expeditionary force packages that complement other service capabilities. These capabilities are resident in readily available and trained regionally and globally aligned Army forces. Reducing reliance on intermediate staging bases, ports, and airfields will better enable an expeditionary Army to respond rapidly and attack simultaneously throughout the depth and breadth of a Joint operations area while diminishing enemy anti-access and area denial (A2AD) capabilities.

The ACC references ADP 1, *The Army*, and DoD Directive 5100.01, *Functions of the Department of Defense and Its Major Components*, when describing the Army's Title 10 requirements. The Army provides combatant commanders the forces and capabilities necessary to execute the National Security, National Defense, and National Military Strategies. This global employment of Army forces in peace and war is vital to ensuring

equilibrium and balancing risk to our Nation's interests. The credibility of our Army, robust, ready, and modernized, underpins our ability to prevent conflict, shape the operational environment, and win the Nation's wars as part of the Joint force.

Additionally, the ACC reiterates the US Army 2012 Posture Statement:

> To maintain credibility and deter adversaries, the Army must develop and field a versatile and affordable mix of the best equipment available. A well-equipped force with significant overmatch demonstrates a level of dominance over opponents that discourages competition and serves as an example to allies and partners. Such a force allows Soldiers and units to conduct operations successfully across the range of military operations and achieve a level of operational adaptability essential to prevent conflict.[3]

Army forces must be responsive and powerful enough to impact the Joint fight early and possess the mobility and firepower to enable JTFCs to develop the situation in close contact with the enemy. Power projection forces rely on a balance of strategic and operational lift, presence, and prepositioning to respond quickly in areas where conflicts may occur. The Army must maintain the capability to set theaters of operations in support of Joint and multinational forces, whenever, wherever, and for however long necessary. The Army must work to reduce its dependence on airports of debarkation (APOD) and seaports of debarkation (SPOD).

The ACC concludes by describing the ongoing strategic shift of focus and resources to the Asia-Pacific region. "The greatest potential threats to [US National Security] interests lie in Asia. The Army must realign its focus and adjust priorities as focus shifts. . . . Some adversaries are investing in anti-access area denial capabilities to counter the US ability to project military force into an operational area with sufficient freedom of action to accomplish assigned missions."[4]

The U.S. Army Operating Concept

TRADOC Pam 525-3-1, *The U.S. Army Operating Concept* (AOC) highlights many of the key points pertaining to Army watercraft already summarized in this chapter under the ACC. In short, the AOC describes an Army with the capability to conduct Joint maneuver with mounted and dismounted forces into austere environments and unimproved entry locations while conducting combined arms operations to exploit positional advantage, put large areas at risk for the adversary, shorten the duration of battle, present multiple dilemmas to the enemy, and contribute to the more rapid disintegration of the enemy force.

The Functional Concept for Movement and Maneuver

TRADOC Pam 525-3-6, *The United States Army Functional Concept for Movement and Maneuver 2016-2028*, provides a functional concept for how the Army will move and maneuver its forces to deter conflict, prevail in war, and succeed in a wide range of contingencies in the future operational environment. It builds on the ideas expressed in TRADOC Pam 525-3-0, the ACC, and TRADOC Pam 525-3-1, the AOC.

The future force may conduct intra-theater maneuver to dominate an area of operations by seizing key terrain, securing populations, or destroying enemy forces and capabilities in depth. Intra-theater maneuver is maneuver within a theater to achieve a positional advantage over an enemy and is synonymous with operational maneuver. The force must have platforms with sufficient speed, range, lift capacity, and the ability to land at unimproved, degraded, or less than optimal locations to enable maneuver and mitigate risks posed by enemy A2AD operations.

The Army must increase the mobility and protection of the maneuver force to ensure they can move and maneuver to positions of advantage. The ideal combination of combat power in the maneuver force is achieved with a force combining the strategic mobility of the IBCT, the mobility and flexibility of the SBCT, and the firepower and protection of the ABCT. These combinations of strategic and tactical mobility create complex dilemmas for the enemy. During the conduct of opposed entry, maneuver forces use multiple distributed points of entry. These points of entry include unimproved landing sites that must be improved quickly to provide entry for heavy forces from the sea or air.

When peacetime efforts fail, maneuver forces participate in Joint entry operations. Maneuver forces move into a required operational area by air, land, or sea, or if opposed, by seizing a lodgment to enable the operations of follow-on forces or to conduct a specific operation. When adequate APODs and SPODs are not available, the future Army forces will require access to nearby ports (ports where access is granted) and intermediate staging bases or sea bases to commence entry operations.

Maneuver forces conduct shaping operations to create and preserve conditions for the success of operations. In this context, the movement and maneuver warfighting function includes the related tasks and systems that move forces to positions of advantage in relation to the enemy. Successful future operations depend on the development and acquisition of systems to increase the mobility of maneuver formations while maintaining an adequate protection level. Additionally, the Army must make provision for accelerated strategic deployment of maneuver forces to allow maximum combat power to be applied early in the shaping phase of the larger operation.

Future Army maneuver forces require the capability to maneuver combat-configured Soldiers and platforms tactically from land or sea bases to operational depths, utilizing austere landing zones to bypass unsecure LOCs and overcome A2AD efforts. Future Army maneuver force platforms require increased mobility and survivability to ensure off road mobility in all operating environments to achieve positional advantage and win the close fight.

The Functional Concept for Sustainment

TRADOC Pam 525-4-1, *The United States Army Functional Concept for Sustainment 2016-2028* describes the sustainment warfighting function as the related tasks and systems that provide support and service to ensure freedom of action, extend operational, reach and prolong endurance. Sustainment facilitates uninterrupted operations through the means of adequate support and includes those tasks associated with maintenance, transportation, supplying, field services, explosive ordnance disposal, human resources, and financial management support.

Future Army forces require the capability to rapidly deploy and sustain forces, equipment, and material to multiple, widely dispersed locations down to the point of employment without reliance on improved APODs or SPODs, to mitigate A2AD challenges, and allow the Joint force to seize and retain the initiative. Future Army forces require the capability to deploy forces with a fight off the ramp configuration which requires minimal reception, staging, reconfiguration, onward movement, and integration prior to employment in austere and complex geographical environments to allow the Joint force to seize and retain the initiative.

Army Water Transport Operations

ATTP 4-15, *Army Water Transport Operations* details the role of Army watercraft in the Joint environment. The transformation of the Army into a strategically responsive, expeditionary force that is dominant across the full spectrum of operations requires significant cultural, doctrinal, and organizational change as well as advanced technological solutions. The major shift in Army watercraft operation focuses on the ability to rapidly project and sustain operational forces within and through the littoral areas of the world. Expeditionary units and enabling technologies provide the commander with the water transport capability to achieve positional advantage over operational and tactical distances. These water transport assets are not limited to operating in major or minor ports, but can also operate in austere port environments, inland waterways, or over bare beaches. To maximize effectiveness, combat forces must be able to move autonomously, plan and rehearse while in route, and arrive in an immediately employable configuration. Army water transport forces provide the combatant commanders the maneuver capability to rapidly move forces, support, and sustainment to the right place, at the right time, and in the right quantities.

The Army Watercraft Fleet is configured and positioned to increase access to areas of operation by supporting fixed port operations, amphibious shore landing, operational maneuver, and sustainment throughout intra-coastal zones and inland waterways. Army watercraft are employed to maneuver combat forces to the place and time they are needed, to manage and clear SPODs, enhance the throughput of an already saturated SPOD through alternative avenues, and to support distribution via intra-theater

LOCs. These operations are conducted forward of the strategic port and are entirely tactical in nature.

Intra-theater surface lift assets such as LCUs, LSVs, and LCMs are designed to provide distributed sustainment in the operational environment. Army watercraft can distribute all classes of supply, to include bulk petroleum, from a seabase, intermediate staging bases, and other land based operating sites to units in the operational environment. Smaller vessels, such as the LCM, are uniquely designed to provide a range of capabilities that include movement of critical cargo and other movements in constricted areas of the littorals and inland waterways. These vessels support maneuver and sustainment by providing access to inland forces and facilities that cannot be accessed by land-based LOCs because of terrain or operational considerations. This gives the ground commander the ability to support small units and distributed forces with a platform capable of maneuvering well into remote areas of the battlefield and with a larger carrying capacity than tactical wheeled vehicles.

Much of the time and resources required today for reception, staging and onward movement will be reduced or eliminated when forces move in combat-ready force packages aboard Army watercraft. Watercraft flexibility complements land maneuver forces' inherent speed and agility by allowing forces to be positioned close to the objective, but out of direct contact with enemy resistance. The Army's landing craft are specifically designed to dramatically increase the ability to access points on the littorals that are currently unavailable to land maneuver forces. The vessels' shallow draft, adaptable cargo space and ramp support delivery of intact ground combat units and

follow-on support and sustainment at a wide variety of points without the need for improved port facilities and the added footprint of terminal service operators.

Logistics over the Shore (LOTS) provides the JTFC ability to maneuver combat power and sustainment to and across bare beach environments. The ability to circumvent obstacles that prevent military use of strategic ports, and maneuver combat power at will is at the heart of the mission of Army watercraft. The tailorable nature of LOTS, and the variety of organic watercraft available within the Army to perform this vital task, is essential to closing and sustaining the force to meet the Army mission.

Ability to maneuver combat forces via the maritime domain includes the ability to move within and across the littorals into inland waterways. Smaller landing craft can provide this maneuver capability. Movement of combat personnel and supplies is the vital mission provided by the riverine element of Army watercraft.

Water transport provides a course of action to introduce combat power through improved or austere points of debarkation; to insert, sustain and retract special operators; to rapidly deploy and employ tailored multinational peacekeeping forces; to introduce first responders, including chemical, biological, radiological, and nuclear (CBRN) assessment teams to deliver medical and humanitarian relief supplies; to evacuate threatened populations and other missions limited only by the imagination of the planners and operators.

As an extension of the land domain, Army water transport maneuver and distributed sustainment capability blurs the traditional lines between the Navy, Military Sealift Command, US Transportation Command (USTRANSCOM) and the JTFC. Command relationships and missions for Army water transport operations are, and must

continue to be, highly adaptable and easily transitioned between varying mission types. Army water transport assets provide capability for underpinning how the future expeditionary Joint force projects and sustains combat power, from peacetime military engagements to major combat operations.

Active engagements at all levels in the Joint Capabilities Integration and Development System (JCIDS) process and venues to inform the Joint community on the abilities of Army water transport operations cannot be over emphasized. Water transport proponency, through the appropriate functional capability boards, will help to ensure informed decisions are made for leveraging a heretofore underutilized physical domain.

Of note, ATP 4-15, *Army Watercraft Operations* was released in April 2015 near the end of this research project. Changes from the 2011 version of ATTP 4-15 with respect to this research are insignificant.

The Landing Craft Air Cushioned (LCAC)

The Landing Craft Air Cushion (LCAC) is a class of air-cushion vehicle (hovercraft) used as landing craft by the United States Navy and Marine Corps. It transports weapons systems, equipment, cargo, and personnel of the assault elements of the Marine Air/Ground Task Force both from ship to shore and across the beach. LCAC is capable of carrying a 60 ton payload (up to 75 tons in an overload condition), including one M1A2 Abrams tank, at speeds over 40 knots. Fuel capacity is 5,000 gallons; the LCAC uses an average of 1,000 gallons per hour. The LCAC is highly maneuverable, but maneuvering considerations include requiring 500 yards or more to stop and 2,000 yards or more turning radius. It provides the capability to launch amphibious assaults from points over the horizon from up to 50 nautical miles offshore, thereby decreasing risk to

ships and personnel and generating greater uncertainty in the enemy's mind as to the location and timing of an assault. Due to its tremendous over the beach capability, the LCAC can access more than 80 percent of the world's coastlines.[5] LCAC are typically not sea-going vessels, and they operate more like an aircraft than a vessel. LCAC crews require rest and recovery considerations similar to aircraft pilots, and the vessel requires significantly more maintenance, upkeep, and safety precautions than the LCM-8.

The Army Watercraft Master Plan

The Army Watercraft Master Plan (AWMP) released in 2008 is the US Army Transportation Corps' most recent comprehensive look ahead for Army Watercraft. MG James Chambers, Chief of Transportation, noted that:

> The Army's Future Force concepts describe an expeditionary and campaign-quality Modular force that is strategically responsive and operationally dominant across the full spectrum of military operations. . . . A critical part of this is a watercraft Fleet that will provide strategic responsiveness to the combatant commands and meet the challenges of an Army with an expeditionary minds. . . . The tenets of this plan will give the Joint Commander a watercraft Fleet et unequalled in its capability to operationally move and maneuver combat forces through multiple access points in response to any contingency.

Army watercraft provide critical capabilities to support full spectrum land combat operations by extending ground commanders' range of maneuver space. Army watercraft enable the Joint force to conduct tactical port and Joint LOTS operations, take advantage of waterborne maneuver and supply routes, and conduct operations through littoral entry points even in the face of access-denial environments. The Army watercraft fleet envisioned possesses the speed, agility, and operational payload needed to maneuver operationally ready modular forces and provides the JTFC with the ability to deliver combat power at the time and place of his choosing.

The AWMP details the Joint Capabilities Based Assessment (CBA) of Army watercraft conducted by CASCOM, with significant combatant command and Joint departmental input, and approved by the Army Capability Integration Center (ARCIC) on 13 November 2007. The AWMP presents an action plan for achieving the capabilities identified by the CBA. The doctrine, organization, training, material, leadership and education, personnel, facilities and policy (DOTMLPF-P) approaches and recommended actions identified in the CBA are focused on the 2015–2024 timeframe described in these concepts. The AWMP is a plan of action for implementing the most important findings of the CBA's three foundational documents described below:

Army Transportation Functional Area Analysis (FAA)

Originally validated on 14 May 2005, revised and updated on 14 September 2007, the FAA examines national strategies, Joint and Army operating, functional, and integrating concepts to identify the key capabilities required of future Army transportation to include the Army watercraft fleet. The FAA results identified Army watercraft as a critical capability needed to enable the Army's future force to concurrently maneuver and sustain land combat forces distributed throughout the asymmetric operational environment. Further, the FAA identified the key capabilities future Army watercraft must possess and the tasks they must perform. The FAA also identifies the conditions and standards to which the tasks must be accomplished.

Army Watercraft Functional Needs Analysis (FNA)

Originally validated on 30 August 2006, revised and updated on 14 September 2007 using results from the FAA, the FNA provides an assessment of current and

planned Army watercraft capabilities against the future operational requirements identified in the FAA. The FNA begins with the Army watercraft tasks identified in the FAA and translates the standards into measures of effectiveness to identify gaps in the Army's ability to meet future force operational requirements. These capability gaps provide the basis for the approaches identified and analyzed in the FSA and ultimately adopted in the AWMP.

Army Watercraft Function Solution Analysis (FSA)

Approved on 13 November 2007, the FSA brought together a broad range of subject matter experts from the Combatant Commanders, the Department of the Army, the Department of the Navy, and other Joint and Army organizations, to identify and analyze a range of DOTMLPF-P approaches to fill the capability gaps identified in the FNA. The FSA identified the need for an integrated DOTMLPF-P approach that includes both material and non-material approaches to meet future Joint force operational requirements.

Table 1 illustrates the summary of the Army watercraft CBA. Specific to the Army landing craft capability, table 1 demonstrates that Army landing craft are not designed to move intact, operationally ready combat units at required rates of speed. Most notably, the LCM-8 lacks the ability to transport the M1A2 tank or two Stryker vehicles on a single vessel.

Table 1. Summary of Army Watercraft Capability Gap Analysis

ARMY WATERCRAFT TASKS (2015-2024 Modular Force Requirements)	CBA (Current Fleet)	CRITICAL CAPABILITY GAP (Creating Red Assessment)
Close the Force		Current Fleet not designed to **move combat ready maneuver units or move at speeds required** to meet COCOM swiftness goals
Establish and Maintain Situational Awareness		Current Fleet not fully equipped with interoperable, **Joint C4ISR capabilities** needed to maintain real-time situational awareness of the COP
Provide BCOTM to Embarked Units		Current Fleet not designed to **support maneuver or equipped to provide BCOTM** to embarked forces
Operate in Open Ocean and Anti-Access Environment		**NONE** – Maintaining Current Fleet capabilities meets minimum requirement (amber assessment)
Provide Operational Maneuver for Combat Forces		Current Fleet not designed to **move intact operationally-ready maneuver forces** to any access point in a manner that meets COCOM timelines
Conduct Distributed Sustainment Operations		Current Fleet does not possess the **speed** to meet Modular Force requirements
Support Terminal Operations		**NONE** – Maintaining Current Fleet capabilities meets minimum requirement (amber assessment)
Conduct Seabase Operations		Current Fleet not designed to **support movement of combat ready maneuver units from a seabase**
Operate in Non-Contiguous, Uncertain Threat Environment		Current Fleet not equipped to **identify threats and/or mount appropriate defensive and/or lethal response**

Source: U.S. Army Transportation Corp, *Army Watercraft Master Plan* (Fort Eustis, VA: Sustainment Center of Excellence, 2008), 3.

Maneuver Support Vessel (Light) Request For Information

Army Contracting Command issued the Request For Information (RFI) in 2014 to identify possible candidates for the MSV(L) as replacement for the aging LCM-8 fleet. The RFI is intended to gather industry input and data regarding available platforms, conceptual designs, and support potential future acquisition efforts. Tables 2 and 3 depict the requirements outlined in the RFI:

Table 2. MSV(L) Requirements versus LCM-8 Characteristics

	LCM 8 Characteristics	Joint Force Commander Requirements	
		Threshold	Objective
Range (Laden, one-way, SS3)	271 Nautical Miles	360 Nautical Miles	400 Nautical Miles
Draft (Laden)	5 Feet	4 Feet	2 Feet
Bow Draft to Deploy Ramp (Min)	2 Feet	2 Feet	1 Foot
Payload	53 Short Tons	76.25 Short Tons	
Speed (Laden, SS3)	9 Nots9 Knots	18 Knots	22 Knots
Ramp Characteristics	Single Bow Ramp	Bow and Stern Ramps to Enable Drive Through Ability	

Source: Army Contracting Command, "Request for Information (RFI) for Maneuver Support Vessel (Light) (MSV(L)) as Replacement for the Landing Craft Mechanized (LCM-8) with Addendum 1 and 2" (Report, Army Contracting Command, Warren, Warren, MI, 15 April 2014).

Table 2 illustrates LCM-8 characteristics compared to minimum and objective key performance parameters of JTFCs for the MSV(L).[6] The threshold is the minimum capability that the vessel must meet to be a favorable option for waterborne maneuver as defined by watercraft subject matter experts in CASCOM.

Table 3. Minimum Carrying Requirements for the MSV(L)

Threshold	Length (ea)	Width (ea)	Weight (ea)	W/in LCM 8 Capability?
Four combat-ready Joint Light Tactical Vehicles (JLTV)(any variant) with trailer, crew and all personnel equipment	** 18.25' **	9'	14 STON	NO
Two combat-ready Stryker's (any variant) with bar (SLAT) armor, crew and all personnel equipment (must be enough deck space to lower the vehicle's rear ramp)	26'	** 14' **	25.5 STON	NO
Two combat-ready Bradleys (M2A2/M3A2) with crew and all personnel equipment (must be enough deck space to lower the vehicle's rear ramp)	21.5'	11.8'	33.5 STON	NO
One combat-ready M1A2 Abrams tank with crew and all personnel equipment	26'	11.8'	** 76.25 STON **	NO
One Kalmar Rough Terrain Container Handler (RTCH). **Requires decking that supports 153,000 pounds per square inch.**	38'	12'	58 STON	NO
One combat-ready Rifle Platoon of the Infantry IBCT with crew and all personnel equipment	X	X	X	YES
** Indicates Limiting Factor **				

Source: Created by author.

Table 3 illustrates probable required payload parameters for the MSV(L) to meet the JTFC's requirements.[7] Information was derived from the AWMP FSA.[8]

How The Army Runs (HTAR), Handbook

The HTAR was designed to explain and synthesize the functioning and relationships of numerous Defense, Joint, and Army organizations, systems, and processes involved in the development and sustainment of trained and ready forces for the Combatant Commander. The HTAR is designed to be revised every two years; the March 2013 edition was the latest version available for review at the time of this research.

The HTAR is a 21 chapter text that includes information relating but not limited to Army organizational life cycle, organizational structure, relationship of Joint and Army planning, force development, planning for deployment, Army reserve components, force readiness, and the Army planning, programming, budgeting and execution process. Specific to this research, the HTAR illustrates where the CBA process fits into the force management and force development structure beginning with Defense Strategy Guidance, the Secretary of Defense's Quadrennial Defense Review, and Defense Planning Guidance. These strategic documents inform the Joint and Army Capstone Concepts as described earlier in this chapter.

HTAR describes the Army's Title 10 requirements for manning and equipping the force as well as describing the functions of Joint capabilities boards and functional capability boards. Joint capabilities boards assist the Joint requirements oversight council in overseeing the CBA processes. The Joint capabilities board reviews insights, findings, and recommendations from the CBA and provides both guidance and direction to the

Joint requirements oversight council. Functional capability boards serve as integrators of Joint capability development and ensure that major programs are fully integrated into Joint architectures from the outset. The overall intent is to ensure that capabilities and systems are focused on Joint interdependency and resolve capability gaps while reducing redundancy within the Department of Defense.

HTAR summarizes the processes and products that identify capability gap analysis. National and strategic guidance inform the Army Capstone and Operating Concepts that Combatant and Joint commanders use to identify requirements to meet those strategies. Joint and functional capability boards weigh capabilities against requirements and inform the requirements oversight council using CBAs.[9]

The Joint Concept for Entry Operations

The need for maintaining our ability to enter foreign territory, when directed by the national command authority, is clear. Once access is achieved, we must be able to accomplish all assigned missions ashore, both in the littoral regions and further inland. The *Joint Concept for Entry Operations* is how the Joint force will conduct entry operations in support of a broader national approach. It focuses on operations in hostile and uncertain environments where opposition is possible or expected, and where such opponents may possess advanced A2AD capabilities. In opposed as well as unopposed operations, geographic and infrastructure impediments may significantly inhibit the deployment and entry of Joint and multinational forces into an operational area. As a result, most of the required capabilities articulated by this concept can also be used to conduct entry in degraded or austere environments where opposition to entry operations does not exist.

To meet that challenge, future mission-tailored Joint forces will establish appropriate operational conditions and conduct entry by fully integrating force capabilities across multiple domains, exploiting gaps in an adversary's defenses at select entry points to achieve operational objectives. The idea is to employ opportunistic, unpredictable maneuver, in and across multiple domains, in conjunction with the ability to attain local superiority at multiple entry points to gain entry and achieve desired objectives.

In the conduct of entry operations, mission-tailored Joint forces will rely on support from the U.S. homeland, intermediate staging bases, mobile Joint sea-bases, expeditionary airfields, and seaports to project power. The Joint force will then envelop, infiltrate, or penetrate in and across multiple domains at select points of entry to place the enemy at an operational disadvantage. Maximizing surprise through deception, stealth, and ambiguity, maneuvering through multiple domains during entry presents many potential threats to an adversary, disrupting his decision cycle and exploiting critical vulnerabilities. This allows the Joint force to seize and retain the initiative while minimizing vulnerabilities during force buildup.

Vietnam Studies, Riverine Operations 1966-1969

This novel details the 2nd Brigade of the 9th Infantry Division in the Mekong River Delta. The brigade, operating with US Naval and Vietnamese forces, established a flotilla on the Mekong River from which they conducted offensive riverine operations for four years. They utilized the LCM as troop and equipment carriers to deliver operational ready forces to key points of entry as well as floating mortar platforms and refuelers that enabled offensive operations. The 9th Infantry Division's use of Army watercraft during

the Vietnam War demonstrated its capability to enhance both movement and maneuver, providing an alternative to the ground and air domains.

Operation Just Cause, The Incursion into Panama

Operation Just Cause, The Incursion into Panama illustrates how the United States Army utilized the LCM to move operational forces, refugees, and detainees extensively in 1989-1990. The 9th Infantry Regiment, weary of enemy A2AD measures, utilized the LCM-8 during operations to move personnel and equipment from PODs to staging bases. The book further details how the 504th Infantry Regiment and Special Operations forces used the LCM-8 to maneuver during raids to capture detainees and free American and political prisoners held in Renacer Prison. The use of the LCM-8 was instrumental to bypassing unreliable ground LOCs and reducing the requirements for Army aviation.

The Need for America's Amphibious Capability

In his thesis, “The Need for the United States of America's Amphibious Capability in an Era of Maritime Focus,” Major Benjamin Grant examined the risks associated with allowing amphibious capabilities to atrophy as did the British military in the late 1970s. Major Grant highlighted events of Operation Corporate as a cautionary tale for the United States’ current strategic, economic, and military conditions demonstrating that the United States is on a course similar to the United Kingdom. Due to strategic priorities and domestic economic issues, the British military was unprepared to conduct large scale amphibious operations against the Argentinians in the Falkland Islands. The United Kingdom's experience during Operation Corporate provides a case

study of a nation that attempted to maintain global interests while experiencing significant military force reductions and strategic refocus.

The Army Concept Framework, informed by National and Military Strategy indicates a growing need for the Army to maintain a maneuverable landing craft capability to ensure an ability to conduct entry across multiple domains, exploiting gaps in an adversary's defenses at select entry points to achieve operational objectives. The CBA of Army watercraft indicates that the Army solution to meeting that capability has significant limitations and will soon be obsolete. The capability that the LCM-8 brings to the JTFC to enhance maneuver as well as enable sustainment proved invaluable when it was capable of enabling the maneuver of combat equipment, but it no longer has that capability.

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[1] Chief of Transportation, *Army Watercraft Master Plan*, D-2.

[2] Ibid., 2-6.

[3] General Raymond T. Odierno, "Statement on the Posture of the United States Army 2012" (Testimony, US Senate and House of Representatives, Washington, DC, February 2012), 6.

[4] Headquarters, Department of the Army, TRADOC PAM 525-3-0, 8.

[5] Department of the Navy, *Employment of Landing Craft Air Cushion (LCAC)* (Norfolk, VA: Naval Doctrine Command, 1997), 1-3.

[6] U.S. Army Contracting Command, "Request for Information," 2.

[7] Ibid.

[8] Chief of Transportation, 3.

[9] U.S. Army War College, *2013-2014, How the Army Runs*, 5-8.

CHAPTER 3

RESEARCH METHODOLOGY

The Landing Craft Mechanized (LCM-8) is one of the Army's most practical material solutions for moving within littorals and inland waterways, but it is at the end of its operational lifecycle and does not fully meet the combatant commander's intent for waterborne maneuver capabilities. In addition to being slow and ill-equipped to facilitate rapid waterborne maneuver, the LCM-8 is unable to transport the weight of an M1A2 tank and lacks the deck space to carry combat ready Stryker vehicles. The Army must decide whether to retain, divest, or pursue a new material solution to fill the capability gap within the waterborne domain. The LCM-8 is the Army's smallest, most practical landing craft capability to conduct operational maneuver to achieve tactical success, move operationally ready forces by water to austere access points, and rapidly support sustainment requirements via inland waterways.[1] Loss of this capability is a dilemma that provides a case study into the Army landing craft capability gap.

Army landing craft was used extensively in direct action, stability operations, and support to civil authority operations over the last century; future Army and Joint operations will likely continue to require a landing craft capability. Chapter 1 of this research outlines the LCM's use in a broad range of military operations from combat in Vietnam and Panama to disaster relieve efforts in Haiti, the Indian Ocean, and within the United States. The Army Concept Framework, informed by national and military strategy, indicates a growing need for a full spectrum of watercraft capability enablers at the tactical and operational level. Army and Joint doctrine resonate the need for an adaptable, expeditionary force capable of supporting the JTFC in any operating

environment with scalable and tailorable force packages. Detailed assessments of Army watercraft capabilities and platforms reveal that Army watercraft can provide extensive options to the JTFC to expand his movement and maneuver capabilities within the land and water domains.

The purpose of this research is to determine the best way for the Army to fulfill the JTFC's requirements for waterborne operations. This research will identify what the requirements are for Army waterborne operations and what capabilities exist to fulfill those requirements.

This chapter outlines the method used to structure landing craft capability requirements into the Capability Based Assessment (CBA) analytical model. Data was collected from Army and Joint publications, historical literature, and scholarly writings about landing craft and amphibious operations. Data was collected qualitatively using a case study method and analyzed objectively using the CBA model.

Qualitative Research Method

Qualitative data are data that invite understanding or interpretation.[2] Qualitative research is primarily exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative research is also used to uncover trends in thought and opinions, and dive deeper into a problem.[3] This researcher will interpret findings from secondary sources including Army and Joint doctrine, historical literature, and scholarly writings about military landing craft with a focus on small, maneuverable vessels like the LCM-8. The Army Concept Framework provides the conceptual foundation for the development of capabilities for

the future force. This family of concepts examines the projected operational environment and provides strategic guidance to develop the capabilities required in support of Army modernization.

This researcher found that the concept framework demonstrates a trend calling for those capabilities provided by small, maneuverable watercraft capable of enhancing movement and maneuver within the littorals and inland waterways. The underlying reasons and motivations driving the capability requirement is the JTFC's requirement to possess multiple options and capabilities for movement and maneuver across all land, sea, and air domains. Analyzing doctrine as the primary source for data mitigates any bias associated with interpreting secondary sources.

Case Study Method

A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.[4] This researcher uses a qualitative case study method to research the uses of and need for Army landing craft, primarily the LCM-8 from the middle of the 20th century until the present.

The primary document in this case study is the Army Transportation Corps' *Army Watercraft Master Plan* (AWMP). The AWMP is a comprehensive document produced in 2008 to address how the Army fleet is structured to meet current and future needs while continuing to transform into a flexible and responsive capability. Complementing the AWMP within this case study are several periodicals, books, and scholarly writings describing how the Army has utilized the LCM-8 and other landing craft in Vietnam,

Panama, and in support of contingency operations around the world and within the United States.

Capability Based Assessment Analysis Model

The CBA model defines and examines requirements through three steps: the Functional Area Analysis (FAA), Functional Needs Analysis (FNA), and Functional Solution Analysis (FSA). With respect to Army landing craft within this case study, the FAA will review the current and future Army operating environment and assess national military strategy, Joint and Army operating, functional and integrating concepts to identify the key capabilities required of future Army watercraft. The FNA provides an assessment of current and planned capabilities against the future operating requirements identified in the FAA. The FNA utilizes measures of effectiveness to identify gaps in the Army's ability to meet future requirements, then it assesses a level of risk that gaps impose on those requirements. The FSA identifies and analyzes a range of approaches to fill the capability gap identified in the FNA. The FSA identifies both material and non-material approaches to meet future requirements. The FSA considers solutions involving any combination of doctrine, organization, training, material, leadership and education, personnel, facilities, and policy (DOTMLPF-P).

The CBA gives the researcher a structured analytical model from which to evaluate current conditions, trends, and demand signals and compare those requirements to the current capabilities within the watercraft realm. Furthermore, the FSA dissects potential solutions into both material and non-material options across the DOTMLPF-P domaine. The CBA analysis will be further refined in chapter 4.

Through case study research and CBA analysis, this researcher identified a definite need for a maneuver capability within the Army watercraft fleet. Research indicates that the future operating environments described in the Army Concept Framework necessitate the capability to conduct operational maneuver across all domains, including the waterborne domain. A predominate theme in Army and Joint concepts is that of an expeditionary force capable of maneuvering to conduct opposed entry operations. Army landing craft are critical enablers to overcome enemy A2AD capabilities and extend operational reach within terrain naturally restricted by coastal and inland waterways. This need will be described further in chapter 4.

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[1] Chief of Transportation, *Army Watercraft Master Plan*, D-2.

[2] Jillian Dawes Farquhar, *Case Study Research for Business* (London: SAGE Publications, 2012), 82.

[3] Ibid., 10.

[4] Ibid., 5.

CHAPTER 4

ANALYSIS

Introduction

This chapter answers the primary and secondary research questions by describing the analysis and interpretation of research data. Chapter 1 provides an outline of the LCM-8 case study including historical use as well as how the vessel is used within the range of military operations today. Chapter 2 outlines the literature available about landing craft uses to support military operations as well as an overview of Army and Joint doctrine that specifies a current and future need for landing craft capability. Chapter 3 is a review of the research and analytical methods used to interpret the research data. Chapter 4 analyzes the future needs for Army landing craft from a capability based perspective. This chapter answers how the Army can best execute waterborne operations requirements to meet the needs of the Joint task force commander (JTFC).

Common Scenario Requiring the MSV(L)

The following scenario represents a probable use of Army watercraft to support the requirements of the JTFC:

Regionally aligned Armored Brigade Combat Team (ABCT) forces working within the PACOM AOR are required by the JTFC to defeat aggressive enemy forces threatening the population of an island nation with repressive actions and weapons of mass destruction. The threat force is a combination of regular and irregular forces attempting to slow the ABCT's advance using a defense in depth, utilizing covered and concealed positions and anti-tank weapons before displacing further north to prepared

defensive positions in urban terrain. The enemy force is equipped with lightly armored tactical vehicles. The Joint Coalition force has established lodgment in the south of the island at the only improved harbor on the island nation and is ready to begin offensive operations against the enemy force.

One company plus additional enablers will maneuver through shallow coastal waterways to seize key terrain, cut enemy lines of communication, and force the enemy to abandon their defensive position along the A2AD corridor leading from the coalition lodgment in the south. (see figure 5) The ABCT company consisting of two tank platoons, two Bradley platoons, and a headquarters element utilizes MSV(L) to present the enemy with multiple dilemmas leading to the rapid movement of the ABCT's main effort to the objective. The MSV(L) company of nine boats maneuvers the combined arms company from the lodgment in the south to a bare beach assault position in the north of the island. The landing craft company is able to transport the maneuver force in two waves. (see table 4)

Table 4. Scenario Landing Craft Loads

WAVE 1 Consisting of 9 Landing Craft	
Vehicle	Quantity
M1A2 Tank	5
M2A3 Bradley	6
M1113 HMMWV	4
HEMTT Fueler	0
HEMTT Cargo (ammo)	0

WAVE 2 Consisting of 9 Landing Craft	
Vehicle	Quantity
M1A2 Tank	4
M2A3 Bradley	4
M1113 HMMWV	4
HEMTT Fueler	2
HEMTT Cargo (ammo)	2

Source: Created by author.

The combined arms company will achieve surprise by landing on the coast ahead of the brigade main effort to secure key terrain behind enemy defensive positions. The threat in the area, comprised of anti-tank vehicles and dismounted forces, is compelled to fight coalition forces from two directions or abandon their defensive positions along the A2AD corridor. The company of tanks, Bradleys, and dismounted enablers secure and expand a beachhead behind enemy defenses to enable follow on operations. The maneuver company destroys enemy forces or compels enemy forces to abandon their defense in depth allowing the remainder of the ABCT to move unopposed to the objective.

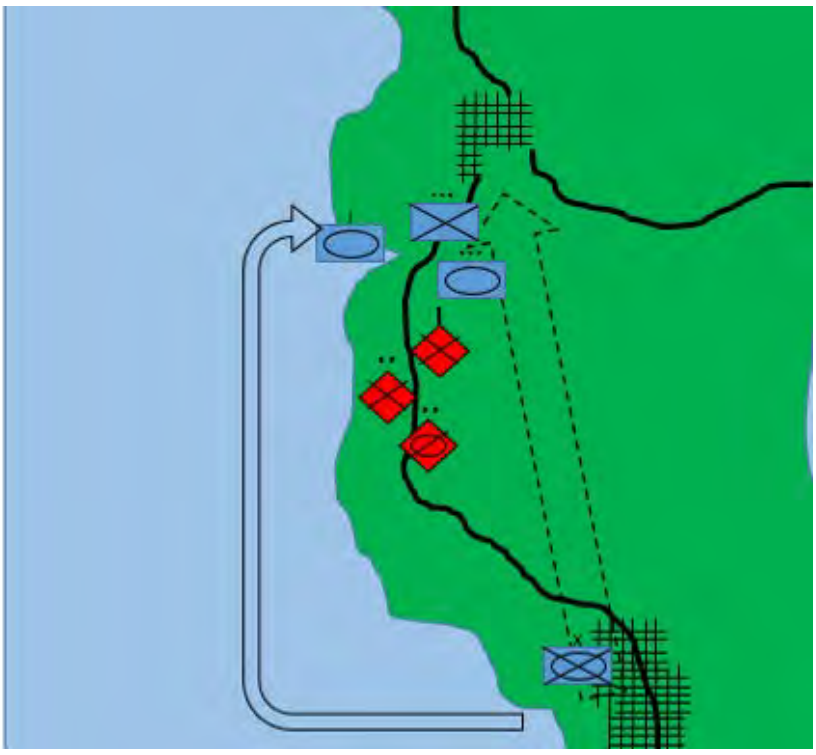

Figure 5. Scenario Course of Action Sketch

Source: Created by author.

Findings

Answers to the secondary research questions provide context for the reader to understand and answer the primary research question. The answers to the research questions are determined by a qualitative Functional Area Analysis (FAA), Functional Needs Analysis (FNA), and Functional Solutions Analysis (FSA) of the research outlined in chapter 2. Chapter 2 details the Army Concept Framework and Joint concepts that are informed by national strategic and military strategy for the next 20 years. These concepts provide a conceptual foundation for conducting Capabilities Based Assessment (CBA) of the ability of our current force to meet the future operational challenges. In essence, the purpose of the CBA is to conceive future threats and requirements and how to best meet them.

The input to the landing craft FAA is the Army Concept Framework and national strategy that describe how the force must operate and the required capabilities to do so. The FAA isolates the required capabilities in the input documents and identifies those tasks that the force must perform and the required performance standards. The output is a list of associated capabilities and attributes that will be evaluated in the follow-on FNA.

The FAA of Army landing craft identified a significant waterborne domain within the Joint operating environment of our future force. Analysis of the ACC and AOC within the Army concept framework identified a growing requirement for Army and Joint forces to possess the capability to move and maneuver within the littorals and to operate in austere environments without the use of improved ports of debarkation. Our future force will operate near urban centers and populations. With 75 percent of the world's population residing near the littorals,[1] the future operating environment will include

water lines of communication both inland and contiguous to the ocean. Operational environments encompassing a waterborne domain will inevitably lead to situations requiring the JTFC to control and utilize waterborne LOCs as movement and maneuver space. Failure to maintain the capability to utilize the waterborne domain will severely limit the options available to the maneuver commander and may force maneuver elements to operate within enemy A2AD zones rather than bypassing them. A vessel with landing craft capabilities and the ability to move combat ready forces to positions of advantage over the enemy will make waterways a maneuver enabler rather than an obstacle to land-based maneuver.

What capabilities must the Army retain to meet JTF requirements for waterborne operations?

The answer to this secondary question was derived from the FAA and summarized below. The Army is required to "secure multiple entry points into an area of operations and the lines of communications that connect those points."[2] Army landing craft must enable the maneuver commander to maneuver against enemy A2AD capabilities as described in the AOC and chapter 2. *The United States Army Functional Concept for Movement and Maneuver* defines intra-theater maneuver as maneuver within a theater to achieve a positional advantage over an enemy,[3] requiring an advantage in speed and time. This research uses the term operational maneuver synonymous with intra-theater maneuver. The *Joint Concept for Entry Operations* illustrates that landing craft used in entry operations must enable mission-tailored Joint forces to envelop, infiltrate, or penetrate in and across multiple domains at select points of entry to place the enemy at an operational disadvantage. In short, the Army requirements for waterborne

operations are to be able to maneuver, in addition to move combat ready forces in expeditionary environments to accomplish opposed entry operations. Landing craft must have the ability to maneuver combat equipment and vehicles within areas of operations marked with inland or coastal waterways. Table 5 lists the combat ready forces that the MSV(L) must carry. The limiting factor is highlighted to show the greatest dimension that the vessel must be able to accommodate. This research does not examine specific size and characteristics required for Army landing craft other than identifying vehicles that must fit on the vessel.

Table 5. Minimum Carrying Requirements for the MSV(L)

Threshold	Length (ea)	Width (ea)	Weight (ea)	W/in LCM 8 Capability?
Four combat-ready Joint Light Tactical Vehicles (JLTV)(any variant) with trailer, crew and all personnel equipment	** 18.25' **	9'	14 STON	NO
Two combat-ready Stryker's (any variant) with bar (SLAT) armor, crew and all personnel equipment (must be enough deck space to lower the vehicle's rear ramp)	26'	** 14' **	25.5 STON	NO
Two combat-ready Bradleys (M2A2/M3A2) with crew and all personnel equipment (must be enough deck space to lower the vehicle's rear ramp)	21.5'	11.8'	33.5 STON	NO
One combat-ready M1A2 Abrams tank with crew and all personnel equipment	26'	11.8'	** 76.25 STON **	NO
One Kalmar Rough Terrain Container Handler (RTCH). **Requires decking that supports 153,000 pounds per square inch.**	38'	12'	58 STON	NO
One combat-ready Rifle Platoon of the Infantry IBCT with crew and all personnel equipment	X	X	X	YES
** Indicates Limiting Factor **				

Source: Created by author.

The FNA is the second analytic phase in the CBA. It assesses the ability of Army capabilities to accomplish the tasks identified in the FAA. The FNA determines which tasks identified in the FAA cannot be performed to standard and which of these capability gaps pose sufficient operational risk to constitute needs that require a solution. The FNA

inputs are tasks, conditions, and standards identified in the FAA and a list of current and programmed capabilities. The output of the FNA is a prioritized list of all gaps in the capabilities required to execute a concept to standard based on associated risk analysis. Identified capability gaps with low associated risk may not require a solution to mitigate the risk.

The first input to the FNA is current capabilities. Chapters 1 and 2 detail the capabilities of the LCM-8, the most practical vessel within the Army fleet for conducting operational maneuver within the waterborne corridor. As described in the preceding FAA, Army requirements for waterborne operations are to maneuver combat ready troops and equipment. The LCM-8 does not meet that requirement due to its limited carrying capacity. It lacks the width and length to move two Strykers or two Bradleys and is unable to transport the weight of an M1A2 tank. The two other landing craft in the Army fleet, the LSV and the LCU, are able to carry the required combat equipment, but the large size, deep draft, and slow speed of these vessels preclude them from meeting the definition of maneuver.

This research must also consider other US service vessels capable of meeting the JTFC's intent. The Landing Craft Air Cushioned, LCAC, is the US Navy's premier landing craft for amphibious assault from ship to shore. The LCAC requires Navy amphibious ships to move it to an area of operations, and the LCAC is not a sea-going vessel conducive to prolonged operations within a theater of operations without a sea base. An Army landing craft capability must be able to operate with little logistical support, independent of a Navy ship base of support.

What capabilities exist to fulfill waterborne requirements?

This researcher has not discovered any US military capabilities that meet the Joint commander's intent for maneuver within the waterborne corridor. There is a physical limitation that exists. In this context, the lack of capabilities to enable waterborne maneuver represents a capability gap. Considering the potential for future operations to require a waterborne capability to enable operational maneuver, there is sufficient risk of this capability gap significantly reducing the JTFC's options and abilities to accomplish his tasks directed in national strategic and military strategy. It is important to note that the larger Army landing craft are still capable of delivering equipment to an austere port to support unopposed entry operations. If the LCM-8 is divested and not replaced with a similar landing craft capability, these vessels will mitigate the risk, but the gap in maneuver capability remains.

The FNA is a comparison of required capabilities to existing and programmed capabilities and the identification of the corresponding gaps. Capability gaps are defined by functional domain, describing common attributes desired of solutions. It must be determined if the risk posed by specific capability gaps rises to the level of need. When the risk posed by a capability gap is unacceptable, the capability gap must be closed or risk mitigated with a solution. The Joint Capability Integration System (JCIDS) produces an integrated set of doctrine, organization, training, material, leadership and education, personnel, facilities, and policy (DOTMLPF-P) solutions based on capability gaps identified in the CBA process. This process helps ensure the Army considers the most effective Joint force capabilities and the integration of those capabilities early in the

process. The product of the CBA is recommended DOTMLPF-P material or non-material solution approaches to fill or mitigate capability gaps.

The third step of the CBA analysis is the FSA. Inputs to the FSA are the high risk capability gaps identified in the FNA. This research identified that the inability for the Army to provide a waterborne maneuver capability as an option to the JTFC is a high risk capability gap. The FSA is an assessment of potential solutions to fill that gap. It is important to consider that all solution approaches must be strategically responsive and deliver solutions when and where needed. They must be feasible with respect to budget, policy, sustainment, and technology considerations, and they must be realizable. The cost in risk and limitation to the JTFC of not having the operational reach capability of the MSV(L) most likely exceeds the cost of fielding the capability. This cost benefit makes the MSV(L) a feasible solution.

The analysis of solutions typically considers material solutions last as they are generally more expensive. This research identified that the military does not possess a vessel capable of enabling maneuver; therefore, a material approach must be considered. The LCM-8 and other US military vessels have structural and performance limitations that cannot be easily modified to meet all of the requirements for waterborne maneuver, so the material approach will consider existing capabilities outside of the US military. This research is unable to replicate the scope of a material solution analysis within the thesis. The process of analyzing capabilities within all Joint partners, industry and foreign military requires extensive manpower, knowledge, and access to information that is outside of the scope of this research.

Given the findings that the Army acquires a waterborne capability designed to enable maneuver, the FSA will continue to include non-material solution approaches within organization, training, doctrine and policy as necessary. An issue that emerged from the CBA conducted on Army watercraft in 2007 outlined in chapter 2 is that operational planners are often not aware of, or do not fully understand how and where to employ Army watercraft capabilities as part of an integrated operation.[4] Along with the development of a material solution, the Army must adequately address the associated non-material solutions within the DOTMLPF-P domain to ensure new solution approaches occur simultaneously. Further analysis of DOTMLPF-P approaches that must accompany a new material solution are necessary but specific to the adopted material solution; therefore, further analysis of non-material approaches is outside of this research.

Ultimately, Army operational and maneuver planners are scarcely aware of the capability gap that exists because using watercraft to maneuver combat ready forces has not been done to any notable extent since the Vietnam War. Over a decade of combat in the deserts of Iraq and Afghanistan did little to highlight that gap. Though the landing craft capability does not exist today to fully meet this researcher's definition of waterborne maneuver operations, landing craft capability has always existed within the Army and was once used extensively for maneuver against enemy forces to achieve opposed landings. Before the acquisition of the M1 tank in 1980, the LCM-8 was capable of delivering a 50-ton M60 main battle tank through constricted terrain to an unimproved debarkation site.[5] Though its performance was not optimal, the LCM-8 enabled maneuver. Theorists and strategic planners should begin including operational maneuver

concepts within the waterborne domain as a considerable option to future operational plans.

What is the best way for the Army to fulfill waterborne operations capabilities?

The best way for the Army to fulfill waterborne capabilities is by fielding a vessel that meets the JTFC requirements for maneuver and is able to deliver all necessary combat ready forces to a position of advantage over the enemy. Additionally, the Army must revise tactics, techniques and doctrine to include this maneuver capability.

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[1] Bowden, *Forward Presence*, 47.

[2] Headquarters, Department of the Army, ADP 3.0, *Unified Land Operations* (Washington, DC: Government Printing Office, 2011), 2.

[3] Headquarters, Department of the Army, TRADOC PAM 525-3-6, *The United States Army Functional Concept for Movement and Maneuver 2016-2028* (Washington, DC: Government Printing Office, 2010), 11.

[4] Chief of Transportation, *Army Watercraft Master Plan*, 2-8.

[5] Military Factory, "M60 (Patton) Main Battle Tank (MBT) (1960)," 25 April 2015, accessed 29 April 2015, http://www.militaryfactory.com/armor/detail.asp?armor_id=28.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The LCM-8 enabled extended maneuver range of ground combat forces utilizing the M60 tank from 1965 to the fielding of the M1 tank in the 1980s.[1] Considering the weight of the M1A2 tank exceeds the carrying capacity of the LCM-8, and the LCM-8 lacks a stern ramp and the deck space to carry two Strykers or Bradleys, the landing craft does not meet the maneuver commander's requirements for functional operational maneuver. Consequently, the aging LCM-8 must be divested to minimize rising maintenance and upgrade costs. The MSV(L) is a material solution concept that meets the needs of the maneuver and Joint Task Force Commander (JTFC) defined in chapter 4. This concept watercraft should replace the obsolete LCM-8 in the Army. The Navy and Marine Corps fleets contain the LCM-8, but this research did not investigate the need for or uses of maneuver support landing craft in those services. The MSV(L) is truly a Joint solution to the capability gap created by a combination of the divestiture of the LCM-8 and the evolution of new and larger ground combat equipment like the M1A2 and the Stryker. The MSV(L) is the critical enabler with the capability to extend the maneuver range of evolving technology.

Army watercraft extends the operational reach of the JTFC; effective landing craft like a MSV(L) will increase options to the ground force commander to maneuver against the enemy while avoiding enemy A2AD assets. The national military strategy that drives the Army Concept Framework calls for the Joint force to maintain an adaptive, expeditionary ground force, regionally aligned and able to project forces worldwide into

any operational setting to conduct operations immediately upon arrival.[2] ADP 3-0 requires that the Army conducts decisive action and combined arms maneuver in support of Unified Land Operations (ULO) to seize terrain and exploit the initiative. Favorable conflict resolution is dependent on ground force capability to maneuver across all domains.[3] The MSV(L) will add operational agility to the Army ground force.

This research highlighted the requirement for the Army to possess a landing craft capability that enables the JTFC to enhance his ground maneuver options. The Army has a variety of combat forces and equipment able to maneuver against enemy forces, but the Army lacks the enabler to extend operational maneuver range into and through the waterborne domain. Without the evolution of landing craft capability like a MSV(L), coastal and inland water LOCs represent obstacles to the maneuver commander that the enemy can exploit to their advantage.

Aided by the Capabilities Based Assessment (CBA) analytical model, this research determined that the development of a material solution like a MSV(L) is critical to meeting the requirements outlined in national and military strategy for the next 20 years. The Army Concept Framework describes a future operating environment within the littoral regions marked by inland and coastal waterways, defended with A2AD capabilities.[4] The outputs of the CBA highlighted that there is a high risk associated with the Army's lack of a landing craft capability that enhances maneuver and increased options to the JTFC to defeat the enemy in those areas.

Furthermore, history demonstrates that the landing craft as a capability within a larger watercraft fleet is an asset with incredible capabilities to support stability operations around the world and defense in support of civil authorities within the United

States. The Department of Defense's increased focus on the Asian-Pacific region will likely include responses to natural or manmade disasters and support through humanitarian aid and relief. As in Haiti in 2010, the Indian Ocean in 2009, New Orleans in 2005, and South Carolina in 1989, the United States Army watercraft is a critical enabler within a region that lacks the infrastructure or capabilities to deliver aid to the right place in a relatively short amount of time. Army landing craft will provide that capability.

This thesis explained the uses of Army landing craft over the last 50 years during combat operations and humanitarian assistance operations around the world. The necessity to replace the LCM-8 with a new landing craft is clear, and the need for that vessel to enhance maneuver with the capability to position combat ready forces in a position of advantage over the enemy, or support humanitarian relief is vital.

Recommendations

Field a Material Solution

The Army should fully investigate and adopt a MSV(L) concept as a critical enabler to enhance maneuver within the waterborne corridor. This capability should be considered as a Joint solution available to the Navy and Marine Corps if those services decide to replace the LCM-8 or require a landing craft that enables operational maneuver. The inability of the Army to extend operational reach into and through the waterborne domain is a high risk limiting factor and a failure to meet strategic and military guidance defined in the Army Concept Framework.

Incorporate Solutions within Doctrine, Policy, Leadership, and Education Approaches

Chapter 4 describes the findings of this research within a functional solution analysis (FSA) method of the CBA analytical approach. The FSA incorporates material and non-material solutions across the range of DOTMLPF-P approaches to find solutions that fill or mitigate capability gaps. The capability gap within the Army waterborne maneuver functional area must be filled with a material solution as described previously in this chapter. Additionally, non-material solutions should be incorporated to help fill the capability gap and mitigate the risks identified in the CBA.

The Army should incorporate doctrine and policy changes in conjunction with the development and fielding of a MSV(L) landing craft capability. The role and responsibilities of Army watercraft must also be more clearly articulated in the Joint context as an extension to ground force maneuver. The lack of an effective and useful maneuver enhancing landing craft over the last few decades coupled with the lack of need for the capability in the deserts of Iraq and Afghanistan has limited the insight of tactical and operational planners into the valuable capabilities such enablers bring. Many senior leaders are unaware of the capability gap.

Theater level planners should consider the capability of Army waterborne operational maneuver during campaign, contingency, and crisis action planning. Demonstrating improved feasibility and effectiveness of combat and contingency operations plans by implementing the capabilities of an Army MSV(L) will help justify the need for that capability within a theater of operation. Army watercraft capabilities are sparsely mentioned in the Army Concept Framework. This research highlighted the limits of Army forces to extend ground maneuver across concurrent ground and water domains,

decreasing operational reach and available options to the ground force commander. Inevitably, the capability gap precludes the inclusion of waterborne maneuver in operational or tactical level planning, but the future fielding of that capability should prompt its inclusion into Army strategic concepts. Army watercraft operational doctrine should be more firmly integrated with Army concepts and emerging capabilities. Once the MSV(L) is fielded, waterborne maneuver must be more clearly defined in doctrine used by maneuver and maneuver support leaders and planners.

Operational and tactical level planners should utilize the LCM-8 as a maneuver vessel during training to reintroduce the concept of waterborne maneuver. Though the LCM-8 lacks some of the requirements for operational maneuver, the vessel is still capable of enhancing training to help commanders link the water and land domains as a bridging strategy while the MSV(L) is developed and fielded. The United States' increased presence and partnerships in the Asia-Pacific provide excellent training environments to incorporate water-based maneuver into land-based operations and help maneuver commanders understand how and where to employ those capabilities as part of an integrated operation. Improved effectiveness and operational reach of ground forces through the use of waterborne maneuver will in turn justify the cost of fielding a MSV(L) capability.

Recommendations for Further Study

This research concluded that the Army must field a MSV(L) to provide the JTFC the capability to expand his ground maneuver options into and through the waterborne domain. Though all military operations are inherently Joint, this research focused on Army watercraft and Army operations within the larger Joint context. The US Navy and

Marine Corps utilize the LCM-8 as well, and it is likely those services suffer the same rising costs and extended operational life of the vessel. This researcher recommends further study into the necessity of the Navy and Marines Corps to replace their aging LCM-8 with a new vessel capable of enhancing maneuver like the MSV(L). The responsibility of the Joint Requirements Oversight Council (JROC) is to ensure new material solutions "have a significant impact on joint warfighting or have a potential impact across Services or interoperability in allied and coalition operations."[5] It is likely that the JROC will require that a MSV(L) has the ability to impact all branches of service before recommending that the concept vessel is fielded. Further study is necessary into the need for and requirements of sister services for a maneuver enhancing landing craft.

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[1] Military Factory.

[2] Headquarters, Department of the Army, *The U.S. Army Capstone Concept*, 12.

[3] Headquarters, Department of the Army, ADP 3.0, 2.

[4] Headquarters, Department of the Army, *The U.S. Army Capstone Concept*, 7.

[5] U.S. Army War College, *How the Army Runs*, 11-15.

BIBLIOGRAPHY

Books

Boose Jr., Donald W. *Over the Beach, US Army Amphibious Operations in the Korean War*. Ft. Leavenworth, KS: Combat Studies Institute Press, 2008.

Bowden, Scott. *Forward Presence, Power Projection, and the Navy's Littoral Strategy*. Arlington, VA: IRIS Corporation, 1997.

Farquhar, Jillian Dawes. *Case Study Research for Business.* London: SAGE Publications, 2012.

Fulton, William B. *Vietnam Studies, Riverine Operations 1966-1969*. Washington, DC: Government Printing Office, 1973.

Phillips, R. Cody. *Operation Just Cause, The Incursion into Panama*. Washington, DC: Government Printing Office, 1990.

Government Documents

Chairman, Joint Chiefs of Staff. *Joint Concept for Entry Operations*. Washington, DC: Government Printing Office, 2014.

———. Joint Publication (JP) 3-02, *Amphibious Operations.* Washington, DC: Government Printing Office, 2014.

Chief of Transportation, U.S. Army Transportation Corps. *Army Watercraft Master Plan, Fleet Strategy April 2008*. Fort Eustis, VA: Government Printing Office, 2008.

Combined Arms Support Command. "Maneuver Support Vessel (Light) Analysis of Alternatives Final Report." CASCOM, Ft. Lee, VA, September 30, 2014.

Department of the Navy. *Employment of Landing Craft Air Cushion (LCAC).* Norfolk, VA: Naval Doctrine Command, 1997.

Goepfert, David A. "The Army in Amphibious Warfare: A Contemporary Appraisal." Masters Thesis, US Army Command And General Staff College, 1987.

Grant, Benjamin W. "The Need for the United States of America's Amphibious Capability in an Era of Maritime Focus." Masters Thesis, US Army Command And General Staff College, 2013.

Headquarters, Department of the Army. Army Doctrine Publication (ADP) 3.0, *Unified Land Operations.* Washington, DC: Government Printing Office, 2011.

———. Army Tactics, Techniques, and Procedures (ATTP) 4-15, *Army Water Transport Operations*. Washington, DC: Government Printing Office, 2011.

———. GTA 55-03-032, *Army Watercraft*. Washington, DC: Government Printing Office, 2007.

———. TRADOC PAM 525-3-0, *The U.S. Army Capstone Concept*. Washington, DC: Government Printing Office, 2012.

———. TRADOC PAM 525-3-1. *The U.S. Army Operating Concept, Win in a Complex World 2020-2040*. Washington, DC: Government Printing Office, 2014.

———. TRADOC PAM 525-3-6, *The United States Army Functional Concept for Movement and Maneuver 2016-2028*. Washington, DC: Government Printing Office, 2010.

———. TRADOC PAM 525-4-1, *The United States Army Functional Concept for Sustainment 2016-2028*. Washington, DC: Government Printing Office, 2010.

Odierno, General Raymond T. "Statement on the Posture of the United States Army 2012." Testimony, US Senate and House of Representatives, Washington DC, February 2012.

U.S. Army Contracting Command. "Request for Information (RFI) for Maneuver Support Vessel (Light) (MSV(L)) as a Replacement for the Landing Craft Mechanized (LCM-8) with Addendum 1 and 2." Report, Army Contracting Command-Warren, Warren, MI, 15 April 2014.

U.S. Army War College. *2013-2014, How the Army Runs, A Senior Leader Reference Handbook*. Carlisle, PA: Government Printing Office, 2013.

Websites

Daily Press. "More Soldiers Sent To Aid Charleston." Accessed 25 September 2014. http://articles.dailypress.com/1989-10-07/news/8910070078_1_sullivans-island-soldiers-ferry.

Holtzclaw, Mike. "Soldiers From Fort Eustis Heading to Haiti." *Daily Press*, 20 January 2010. Accessed 25 September 2014. http://articles.dailypress.com/2010-01-20/news/dp-now-eustis-haiti.j20_1_soldiers-from-fort-eustis-10th-transportation-battalion-haiti.

Kilner, James. "Landing Craft Bring Food to Haiti's Hungry." Thomas Reuters Foundation. Accessed 25 September 2014. http://www.trust.org/item/20100129152200-1k60z/?source=search.

Military Factory. “M60 (Patton) Main Battle Tank (1960).” Accessed 29 April 2015. http://www.militaryfactory.com/armor/ detail.asp?armor_id=28.